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ABSTRACT

An evaluation was conducted to determine how the PLATO Pathways program was used in three high schools in Volusia County, Florida: Deland, New Smyrna Beach, and Atlantic. Of the many PLATO sites in Volusia, these three were selected for study because of the representative patterns of low, medium, and high PLATO use. PLATO is a computer learning approach that can be individualized. The evaluation was a descriptive study that compared the three sites and suggested possible areas of improvement for future PLATO implementation and use. Among the findings was that the School Board-mandated assignment of PLATO labs to support school district athletes was well-intentioned, but caused much uncertainty. The factors that seemed to accompany successful implementation were a dedicated laboratory manager, strong building leadership, and creative training and incentives for faculty. These factors were consistent with those outlined in one of the PLATO technical guides. (SLD)

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Evaluation Series

Volusia County, Florida

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Evaluation Prepared by:

Bob Hannafin, Ph. D.

The College of William and Mary

Series Editor:

Rob Foshay, Ph. D.

Vice President,

Instructional Design and Cognitive Learning

PLATO Learning, Inc.
10801 Nesbitt Avenue South
Bloomington, MN 55437
(800) 869-2000
www.plato.com

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Executive Summary

The purpose of this evaluation report is to describe the manner in which the PLATO Pathways program has been used at three high schools, DeLand, New Smyrna Beach, and Atlantic, in Volusia County, FL. Of the many PLATO sites in Volusia, these three were requested by the client for study as representative of patterns of "low," "medium" and "high" PLATO use. This evaluation is a descriptive study which compares the three sites and suggests possible areas of improvement for future PLATO implementation and use.

- Some of the more important results of this evaluation include:
- School Board mandated assignment of PLATO labs to support district athletes was well intentioned, but caused much uncertainty

The factors that seemed to accompany successful implementations were: a dedicated lab manager, strong building leadership, and creative training and incentives for faculty.

These factors are consistent with the implementation success factors outlined in PLATO Technical Paper 5[1].

Two tables are included in the evaluation which detail instructor attitude survey results. Suggestions are outlined for maximizing the effectiveness of future PLATO use in Volusia County.

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[1] Foshay, W.R. *A guide fir implementing technology: Or, not that we've got them, what do we do with them?* Technical Paper #5. Bloomington, MN: PLATO Learning, Inc., 2000.

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Introduction

In 1997, the School Board of Volusia County, FL, adopted a pass-to-play policy for the county's high school student athletes, whereby athletes who did not pass all of the their core courses were not allowed to compete in intercollegiate athletics. To support athletes' efforts to meet this new standard, the board authorized the purchase of 25 new computers and PLATO site licenses for each of its nine high schools. The Board stipulated that these new computers be available after school for athletes who needed academic support and remediation. A part-time instructor was also provided to staff the after-school program for each school along with technical training for these new personnel. Although the justification for the initial purchase of equipment and software was to support the pass-to-play policy, the Board and district administrators soon realized the potential for more widespread implementation, and encouraged all students and teachers to use the labs during the school day (as long as athletes continued to have access to a staffed lab after school). As a matter of Board policy, then, each of the nine high schools was required to have a staffed PLATO lab with 25 computers available after school for athletes; but beyond that mandate, how the labs were used varies greatly across the nine schools.

This report does not attempt to assess the effectiveness of the pass-to-play policy. Rather, it examines the overall PLATO-supported strategies used by three of the county's nine high schools; DeLand High School, New Smyrna Beach High School, and Atlantic High School. These three schools were selected by Volusia administrators because they represent different levels of PLATO usage (low, medium, and high) and could potentially inform effective implementation strategies. The report does not attempt to compare or judge these schools in any way. The Board's policy imposed on

each school was well intentioned, but provided little guidance for how to use this new asset other that the pass-to-play mandate. Thus it is completely reasonable that each school's implementation strategies varied greatly.

The report is organized as follows:

- Background - Role of the County's Central Office and School Board
- DeLand High School Implementation
- New Smyrna Beach High School Implementation
- Atlantic High School Implementation
- Conclusions/recommendations

The roles of the Volusia county district office and its school board are discussed first to establish implementation context and to understand how the district policies influenced the schools' implementation plans. Then the program at each school is examined.

The overall design of this evaluation was mutually agreed upon by the evaluator and Ms. Allene Dupont, the County's Coordinator of High School Services. Ms. Dupont arranged and scheduled all of the interviews and site visits. The cooperation of Volusia County's central office (in her person) was critical and indicates a strong commitment to objective evaluation that can inform strategic direction. They are to be commended and thanked for their willingness to critically examine strategies to identify best practices.

An important backdrop to this implementation effort at Volusia's high schools is Florida's high school competency requirement. In many ways, Florida high schools have been forced to adjust and make instructional changes to adapt to changes in the

Florida standardized test, the Florida High School Competency Test (HSCT). At the time this evaluation began (October, 1999), the HSCT was being phased out and replaced by the Florida Competency Achievement Test (FCAT). Passing the HSCT was a graduation requirement in Florida since 1997 and has required all high schools in the state to devise an effective plan to deal with failing students.

Background - Role of the County's Central Office and School Board

Volusia county is located on Florida's east coast. It is a large (18,000 high school students, nine high schools) racially and ethnically diverse county with large African- and Mexican-American populations. According to Ms. Dupont, the population of Volusia, like most coastal counties, is very transient thus presenting the schools with unique challenges. Many of its students' families are migrant farmers who follow the growing season around the southern states; other students' legal guardians are retirees who visit the county only during winter season. The overall mobility rate for the district's nine high schools ranges from 29 % to 40 %. This compares to the overall state average of 27 %. Mobility rates for schools included in this report are as follows: DeLand High School 36 %; New Smyrna Beach High School 31 %; Atlantic High School 37 %. Ms. Dupont reports that average income level in the district is "below average," but the percentage of students receiving free lunches for the three school of interest were each below the state's average of 27 %: DeLand 25 %, New Smyrna Beach 21 %, and Atlantic 21 %.

In 1997, the School Board of Volusia County adopted a pass-to-play policy for the county's student athletes, whereby athletes who did not pass all of the courses in the four core areas (mathematics, science, social studies, and English) were not allowed to compete in interscholastic athletics. The enforcement of the policy, however, was delayed until the 1999-00 academic year to enable a system-wide strategy to be developed and put in place. The strategy the Board implemented to support athletes' efforts to meet this new standard was to authorize the purchase of 25 (increased to 30 in 1998-99) new computers and PLATO site licenses for each of its nine high schools. The Board stipulated that these new computers be available after school Monday-Thursday

for athletes who needed academic support and remediation. Part-time instructors were also provided for all schools to staff the after school programs, along with PLATO training for these new personnel. As mentioned, the Board and district administrators realized the potential for more widespread implementation, and encouraged all students and teachers to use the labs at any time. Thus, Board policy mandated that each of the nine high schools provide a staffed PLATO lab after school for athletes but was silent on how the labs were to be used and integrated into the general curriculum. Hence, lab usage varied greatly from school to school.

During the 1998-99 academic year, the uneven PLATO usage became quite obvious to central office administrators. Some schools used the PLATO labs merely to strictly adhere to the Board's mandate while others used it extensively across the curriculum labs. Explaining this phenomenon was of particular interest to Dr. Chris Colwell, Assistant Superintendent of Instruction. Dr. Colwell was also interested in solving a couple of related problems. The increased usage in some sites had also been accompanied by some PLATO-related technical glitches and staffing problems. He assigned Ms. Allene Dupont, Coordinator of High School Services, to oversee the PLATO implementations and try to gather data and recommend a sensible course of action.

Interviews

Ms. Allene Dupont, Coordinator of High School Services. I met with Ms. Allene Dupont in her office, which is located at the Volusia County's main administrative office complex. All of the county data and information contained in this report were provided either by Ms. Dupont during our interview and other communications or in county reports and publications. We spoke for about one hour about the issues

surrounding the Board's decision to adopt the pass-to-play policy and its decision to purchase the computers and PLATO site licenses. We also discussed the ways schools have used PLATO. Ms. Dupont was forthright and direct in answering all questions. Overall, Ms. Dupont is positive about PLATO and its potential. However, she sees several challenges that need to be addressed.

In response to a question about who made the decision to buy PLATO, Ms. Dupont told me of the political realities that led up to and surrounded the pass-to-play policy: "There was a general feeling among Board members, and I think shared by many in the district, that we (Volusia County schools) should not produce athletes who could not perform academically...so the pass-to-play policy was an outgrowth of that...but the Board also realized that a policy like that would not work without a support mechanism in place to ensure success. That is when they decided to buy the computers and PLATO. The Board received a favorable recommendation from a neighboring high school [later identified as Lakeland Senior High School in Lakeland, FL] and PLATO was approved by the county's MIS (Management Information System) department... But there were no requirements for athletes to attend... It was thought to be self-enforcing... It is strictly up to the coaches and the players to monitor grades and get athletes who needed help to attend the after school labs."

The Board's unusual action represented a departure from normal procedure for purchasing software to be adopted by the entire district. Ms. Dupont explained, "This [Board decision] was very different from the regular procedure for purchasing software. The district's curriculum committee (comprised of Dr. Colwell, Ms. Dupont, the Director of K-12 curriculum, and each of the district's curriculum specialists) makes district software purchase recommendations. The committee usually gets feedback

from users, gets input from MIS about compatibility, investigates whether we have adequate tech support, and makes their recommendations to the superintendent of instruction. The Board is good - they have the kids' interest at heart. But this decision was a political one and was made unilaterally."

Once the policy was decided, the computers were purchased and PLATO installed, the next logical issue was one of training. There were several factors that initially conspired against the start of a successful training program. Ms. Dupont recalls, "We had a fairly elaborate training plan that was developed with a PLATO Educational Consultant (EC), but he just did not work out. He was not a 'professional development' person. We worked with PLATO to find another person but she only lasted two weeks before being promoted within PLATO. Her replacement, Mike Jackson, started in March and was pretty good. He did some good training. But unfortunately, he left in August to take another job with a local bank. So our users started to rely on the district for support and our non-users were too afraid to try anything [fearing lack of support]." The need to provide onsite support was not caused by the need to support athletes' use of the PLATO labs. The need for support and training was an outgrowth of the increased usage by classroom teachers who wanted to use the labs in their regular courses. This increased usage by regular classroom teachers caused the district to look for a full time support position who also knew the curriculum. Ms. Dupont explained, "after Dr. Colwell assigned me to work with [the] PLATO [implementation], we hired an instructional specialist who was an excellent staff developer. She would go out to the schools and work with faculty and curriculum, as well as the technology."

I asked Ms. Dupont to identify the district's goals and expectations for the PLATO lab implementations. She said that beyond the minimum expectation that every school keep the PLATO lab open after school Monday through Thursday for athletes, there were no stated goals but that "the implicit goal was to improve scores in the four core areas and to improve the HSCT scores." Each of the nine schools used it, however, in a variety of ways; but schools that used it did so at their own expense. She continued, "individual schools used it or did not use it in a variety of ways...if schools decided to integrate it into the curriculum, additional costs were out of their own budget - although the district tried to find creative ways to support schools who are using it. The Board [initiative] only supported the after-school program." Asked to venture an opinion why certain schools used it in the curriculum and others did not, Ms. Dupont replied, "successful schools have re-configured labs and availability of labs for teachers who want to use it as a tool to support what they are doing in the curriculum. Schools have also been supportive of teacher training and have been flexible (logistically) with the schedule - moving kids in and out of courses. Some users are really excited about it. They use a team approach. We've only begun to tap into PLATO's potential. System-wide teachers don't have a strong grasp of what PLATO can do to design curriculum. We don't have a good handle on things for skill remediation."

Dr. Chris Colwell. Assistant Superintendent of Instruction. Ms. Dupont and I met Chris Colwell for about 30 minutes in his office. Dr. Colwell was a teacher in the district and then a principal at a middle school and Atlantic High School for five years before moving into the central office administration. He has been in his current position for one year. Like Ms. Dupont, Dr. Colwell was direct and forthcoming in his responses. Overall, he was happy with what he had seen with PLATO in the short time they have used it but has some concerns with technical support, particularly if they

continue to increase in usage. [These issues tended to be school-specific, rather than District-wide or applicable to PLATO in general. They are identified in the interviews with school personnel and analyzed separately in Appendix A. Dr. Colwell's more general administrative concerns are described here.] "There has been a very dramatic increase in usage," Dr. Colwell began, "I have gotten many more complaints (requests for technical assistance) which is good - they are using it. There is a large increase over last year at every site. We have requests to increase the site license and increase labs. There have not been complaints about the quality of the program."

Although Dr. Colwell is optimistic about PLATO and its potential, he has concerns about the level of support, as usage increases. He elaborated, "customer service questions have been hard to answer [by PLATO]. We've had training problems, support, hardware, software, response time - it has certainly not been intentional - or out of apathy [on PLATO's part]. I think an implementation of this magnitude was larger than they (PLATO) anticipated or were ready for." He made the observation, " If the technology is not reliable - it will be too easy for many (non-users) NOT to use it." However, he was realistic about where they were in the implementation cycle, "I still see it as a work in progress. The teachers like it, but I believe that usage will drop off unless the technical problems are fixed and soon."

Dr. Colwell explained that he thought the reason for increased usage during school hours was that "teachers see that it can help many students of all ability levels." He stated that several schools have requested more site licenses to accommodate the increase in teachers who want to use PLATO. But he has concerns before he commits to a greater investment than the 300 or so licenses they have already. He wonders if there is an upper limit to the number of stations where PLATO can run efficiently, "can

PLATO handle 500? 1000? 5000 stations? I need to know BEFORE I buy any more. I'd rather have fewer licenses and stop now if it means they will all work the way they're supposed to. I just want to know. I don't want to exacerbate the problems (by buying more)." He had other technical questions related to installation, "do we need a dedicated server - at what number do we need a server? We're at a critical juncture." He sees competition (like Jostens) perhaps convincing teachers and principals to switch to their product because they can handle bigger implementations. Dr. Colwell acknowledges the need to invest but he wants to be sure of a return on the district's investment, "I want to buy more site licenses, but I don't want to throw darts at 100 grand (100 thousand dollars) a pop." [2]

Evaluation Design

This evaluation examines PLATO implementation strategies at three high schools in Volusia County in October 1999. Each school was provided the identical mandate and financial support, but devised dramatically different plans. PLATO module-mastery and time-in-program data as well as HSCT and FCAT test results were available for Fall 1999 and Spring 2000 semesters. However, individual students test scores could not be associated to their PLATO data due to the district's concerns with student confidentiality issues, so the relationship between PLATO usage and achievement could not be examined. Affective outcomes were measured with questionnaires

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[2] In the interest of Volusia students, I communicated these concerns to PLATO immediately after this interview and steps were taken to address some of Dr. Colwell's concerns. Further analysis and recommendations are presented in Appendix A. Key issues appear to be implementation planning and network performance.

completed by faculty. Site interviews were also conducted with several key faculty and with students.

The evaluation seeks to examine relationships among implementation variables as well as describe a rich picture of participant attitudes and beliefs. I used the PLATO site overview questions to structure the interviews, and then allowed the inquiry to be guided by the concerns and perspectives of the participants. Data Analysis. Results of the instructor surveys completed by three Atlantic High School teachers are reported (teachers at New Smyrna Beach and DeLand had the opportunity to complete instructor surveys, but because most did not use PLATO regularly, they chose not to). For open-ended survey items, similar responses are summarized and reported. In reporting the interview results, common threads and main ideas were collapsed and summarized. Pseudonyms are used for all student interviews.

DeLand High School Implementation

DeLand High School (DHS) was included in this evaluation report for three reasons: 1) PLATO usage by its teachers in the normal curriculum was characterized as "low," 2) its comparability to the other two schools included in the evaluation, and 3) its proximity to the other two schools.

Program Description

PLATO Program Goals. DeLand used PLATO for the required pass-to-play after school program and to support a summer program. Beyond that, a small number of teachers used it in their regular classes for a variety of instructional purposes. For example, one science teacher and two math teachers used it to supplement content

covered in class - generally in whole-class activities. Some teachers used it for HSCT remediation. But in general, PLATO has not been integrated into the curriculum in meaningful ways; the main program goals focus on supporting athletes meet the pass-to-play policy.

Instructor Characteristics and Role in Program. A teacher was assigned to the PLATO lab Monday through Thursday during the school year to staff the pass-to-play lab for athletes. A math teacher who was teaching summer school (for students who failed during the regular year) chose to use PLATO to support her students. The role of the instructors who used PLATO in their regular courses during the school year was fairly consistent. They did not use PLATO's FCAT alignment or PLATO Pathways facilities to design curriculum to align with their overall course content. Each teacher was alone in trying to grapple with curriculum alignment. A full-time, dedicated lab technician was available, but he was not dedicated to PLATO, nor was he a curriculum resource.

Evaluation Implementation

Procedures for data collection. During my October site visit, I met and interviewed the following DeLand faculty and staff:

10:00 Mr. Mitch Moye, Principal

10:30 Ms. Deb Beavers, Math Teacher; Ms. Mary Lundell, Science Teacher; Mr. Lou Keefe, Computer Technician; Ms. Kathy Hardy, Math Teacher

11:40 Three students

Results

The interviews conducted by the evaluator during the early October, 2000 site visit to DeLand are summarized and analyzed in this section.

Mr. Mitch Moye, Principal. Ms. Allene Dupont and I met with Mr. Moye, DHS principal, in his office for about one half hour. He welcomed us into the school and provided some background about the history and politics of the pass-to-play policy. Mr. Moye was a middle school principal before coming to DHS, where he is beginning his third year as principal. He began, "three years ago, there was no technology at all here. DeLand is a magnet school for the international baccalaureate program [so the emphasis was on other things]. But we now have 150 [computer] stations – 30 of which are PLATO."

He explained his philosophy about PLATO lab usage, "I restrict the PLATO usage to the Monday to Thursday after school. I want to reserve the labs for internet research activities." He described the efforts the school made to support the athletes, "the athletic director and coaches monitor athletes' progress and recommend who needs to come to the PLATO lab. We also sent letters home to announce (to athletes' parents) that the labs were available. But we had no leverage with the students. They (the athletes) had a bad attitude about it. The lab managers and the coaches should have coordinated with the classroom instructors to align PLATO with the course they were struggling in. They used it for review mostly. But it does not seem that was the case. The lab managers simply baby-sat for the athletes."

I began a line of questioning that might help explain why teachers did not use PLATO in the regular curriculum. When asked if training (or lack of) was an issue, Mr. Moye replied, "no, not really, training is not the issue." He reported that students have some problems navigating in PLATO, describing PLATO as "cumbersome," meaning that some students found it hard to use – and needed the attention of the lab managers. This assertion seemed to be a reflection of general comments relayed from teachers who used PLATO during the summer program rather than from documented cases. When I asked why it was not used in regular class time, Mr. Moye responded, "test prep (for HSCT and FCAT) is just too important." I asked if he knew that PLATO could be used for remediation and test review. "Yes, but I didn't want to do that. Internet research is more important. And FCAT is not easily prepped for. And I do not want to detract from the normal curriculum. We have heterogeneously grouped classes – kids are all over the place." Again, I followed up for clarification, "Did you realize that PLATO can customize the curriculum for each student?" "Yes," Mr. Moye replied, "but even still."

It was a fairly clear that Mr. Moye had some philosophical issues that prevented him from using computer-assisted instruction, like PLATO, for a variety of instructional tasks. I think he was very reluctant to use computer-delivered instruction because he believes that a human teacher will always be able to do it better. He reported that his view of PLATO has changed somewhat (for the better) during this past summer as some of his teachers have reported some success using PLATO. I asked him if he thought PLATO has helped him achieve some of his goals. He replied that he would let his teachers answer that, possibly not wanting to reply in the negative, or perhaps because he was reserving judgment after the positive experience in the previous summer.

Ms. Mary Lundell, Science; Ms. Deb Beavers; Math; Mr. Lou Keefe, Computer Support and Lab Manager; Ms. Kathy Hardy, Math. I met with Ms. Lundell, Ms. Deb Beavers, Ms. Kathy Hardy, and Mr. Keefe together in a conference room near Mr. Moye's office. The group interview is summarized here into comments and concerned expressed by the individual participants. Ms. Lundell teaches earth science and biology .She was also the after-school PLATO lab manager during this past year. She encountered some technical problems with PLATO (see Appendix A for analysis and recommendations). Ms. Lundell believes that PLATO is better for student acquisition of lower-level skills versus synthesis or other higher-order thinking skills. "The greatest benefit is for low ability students. Kids who try really do well. I liked the earth science tutorials." [3] When asked if they used Fastrack to place students in PLATO, she replied that she did not.

Ms. Beavers used the lab for HSCT review last semester. She brought her class in twice per week for nine weeks. She was optimistic about PLATO's potential but voiced frustration about the lack of curriculum alignment and some technical problems she encountered. "I think it helped," she explained. She offered a perspective somewhat different from Mr. Moye's. "Once these kids have failed, we've lost them. They have already listened to me and didn't get it - so they tend to give up and tune me out. Maybe it will help them. The HSCT was very tough for a lot of kids."

When I asked Ms. Beavers if they used Fastrack, she was genuinely surprised. It was apparent she never heard of it. She mentioned that she tried to use "prescriptions" but

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[3] *Editor's Note:* Since this evalation, PLATO has greatly expanded its science curriculum offering with the CyberEd curricula.

the technical problems were difficult. Not using any of PLATO placement or diagnostic tools, Mrs. Beavers had to, herself, bridge skill level for each student individually to meet the HSCT standards.

Mr. Keefe is the school's computer technician; the one who addressed teacher problems in the lab. He was very encouraged after the summer when PLATO was used fairly extensively. He saw students make some real progress. But after the school year started, he was very frustrated with the "prescription" problem – referred to above by Ms. Beavers. He speculated that PLATO is "too BIG" and "may have some sort of conflict between the original Unix operating system[4] and the later Windows updates." It was unclear to the evaluator what Mr. Keefe's speculation was based on. The exact nature of the 'prescription' problem was also a bit unclear. Nonetheless, he was clearly frustrated and had tried to solve the problem for 3 weeks (until the day of the interview) allowing the problem to persist in class during this time. He did not call for assistance from PLATO but tried to figure it out on his own, becoming very frustrated when he could not overcome the problems. He also knew nothing about Fastrack.

Ms. Kathy Hardy joined us in the conference room after about 45 minutes, Ms. Hardy is a math teacher who used PLATO during the summer and last semester for HSCT remediation. Overall, she was positive about her experience with PLATO. "We spent the whole 90 minutes of class time during the summer in the PLATO lab – which was too long - but it was a positive experience. The instruction is sound and the kids like the self pacing." She too reported, "kids who tried hard, did well. For freshmen, and

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[4] *Editor's Note:* PLATO was never built as a native Unix application. All code is native Windows.

ESE students, the visuals were very helpful. If they had to read it, forget it." She recommended more feedback on some constructed response questions. "PLATO would judge an answer to be incorrect with insufficient feedback for students to determine where their error is.[5]" She also believes that the time on task calculations are inaccurate.[6]

After the teacher interviews, three freshmen students, Joan, Jane, and Mike joined me in the same room for about a 15-minute group interview. The students seemed to agree with all comments offered by any one of them, nodding their approval. The group interview format may have inhibited some students from voicing a dissenting opinion, but on the other hand, I believe it provided students with a feeling of support of numbers and on balance, encouraged more candid reactions.

All students indicated quite vigorously that they preferred working in the PLATO lab to their normal classes. Each of the students had used the lab on a limited basis in either math or science. But unfortunately, their first rather discouraging reaction was to voice their preference for the computer over some of the teachers they've had. "Computers can't argue with you. It is better than some teachers," who Mike described as "not caring about student learning." Mike recalled one teacher telling him, "I don't care what you learn. I get paid one way or the other. If they don't care about my

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[5]*Editor's Note:* Diagnostic feedback for commonly occurring wrong answers is an instructional design standard for PLATO. In constructed response items, unusual wrong replies typically receive a reminder of the relevant concept or principle on first try, and modeling of the correct answer on second try.

[6] *Editor's Note:* Unexpected time-on-task totals can sometimes result from administrative practices such as not requiring logoff when the learner leaves the lesson to work on something else.

learning, I just stop trying. Why should I care?" All three students indicated that their current teachers were all fine. This negative impression among these students may have been just a case of adolescent "establishment bashing." But on the other hand, it is a painful reminder of how one bad experience with a teacher can influence these impressionable minds for many years. The important point is that they enjoyed the PLATO labs as a supplement to their normal classes.

New Smyrna Beach High School Implementation

New Smyrna Beach High School (NSBHS) was included in this evaluation report because: 1) PLATO usage by its teachers in the normal curriculum was characterized as "medium," 2) its comparability to the other two schools included in the evaluation, and 3) its proximity to the other two schools.

Program Description

PLATO Program Goals. NSBHS used PLATO for the required pass-to-play after school program, selectively to support certain teachers' coursework, and for HSCT/FCAT preparation. Several teachers used it in their regular classes with the help of a part-time lab manager who was available on a limited basis to help them. PLATO has been somewhat integrated into the curriculum.

Instructor Characteristics and Role in Program. As with all Volusia high schools, a teacher was assigned to the PLATO lab Monday through Thursday during the school year to staff the pass-to-play lab for athletes. A math teacher who was teaching summer school (for students who failed during the regular year) used PLATO to support her students. The role of the instructors who chose to use PLATO in their regular courses during the school year was similar to DeLand's teachers. They did not use PLATO to design or align the curriculum with their overall goals; instead working alone to aling curriculum. A full-time, dedicated lab technician was available, but dedicated only part-time to PLATO, nor was she a curriculum resource.

Evaluation Implementation

Procedures for data collection. I met and interviewed the following NSBHS faculty and staff:

- 12:30 Ms. Sharon Ohlsen, Assistant Principal
- 1:00 Ms. Debbie Dailidonis, Social Studies Teacher; Ms. Anne Cooney, Science Teacher
- 2:00 Ms. Julie Hubbard, Lab Manager
- 2:30 Four students
- 2:45 Four students

Results

The interviews are summarized and analyzed in this section. I arrived at the school and was greeted by Dr. Sharon Ohlsen, the school's assistant principal and coordinator of instruction. She had scheduled a conference room where I met with Ms. Debbie Dailidonis and Ms. Anne Cooney together, followed by two groups of students. I met Dr. Ohlsen again later for an interview but report that interview first.

Dr. Sharon Ohlsen, Assistant Principal. Dr. Ohlsen described the three main ways that NSBHS uses PLATO: "we use the tutorials, we integrate it into the regular curriculum, and we use it for test prep." Dr. Ohlsen explained that some teachers have resisted integrating PLATO into their courses in a major way. She explained, "they perceive a mismatch between what they want to do and what PLATO can offer. Teachers simply don't know what's there (in PLATO). And some don't like the heavy reliance on multiple-choice format." She believed that PLATO could be stronger in literature

content.[7] But she likes PLATO and thinks it will grow in popularity as teachers learn how to use it. "It is really good for struggling and at-risk kids. It forces them to work."

She described how many teachers work PLATO into their courses. Many teachers give their students extra credit to work in PLATO since they cannot get course credit for the PLATO modules. "I see more and more teachers using it to introduce or review a unit. It is a different way to present the curriculum and the kids like it." In terms of test preparation, she explained that the special HSCT classes for seniors in English and Math use PLATO but only on a limited basis.

Ms. Debbie Dailidonis, Social Studies; Ms. Anne Cooney, Science. Ms. Dailidonis used PLATO last spring in her social studies class. "I took my freshmen down to show them – sort of orient them. We did a 'Romans Unit' this year in PLATO and they liked it. It was different." She described one limitation was that PLATO leaves out the first four ancient civilizations (e.g., Babylonia) – starting instead with the Ancient Greeks. "It'd be nice if the curriculum could be modified to follow the text. And there is some inconsistency in terms." Importantly, she used it herself, and became familiar with it before sending the kids to the lab. "I went through it (PLATO) first BEFORE I sent the kids down there. I do like it to review for the county test and to review at the end of the semester."

Ms. Cooney teaches Chemistry. She recalls problems with the superscripts/subscripts and had several other program recommendations.[8] She sees PLATO's visuals as

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[7] *Editor's Note:* Since the evaluation, PLATO has released an entirely new and greatly expanded reading curriculum for K-14. At the time of the evaluation, only two of the courses in the new curriculum were available.

valuable. "Regular students have trouble. New science material is over their heads when they have to read it. They don't understand. They need more visual help." Ms. Cooney identified that the lack of dedicated support in the lab as a factor limiting her use of the lab. "Mrs. Hubbard (the lab manager) handles the technical problems. But she has seven students who are struggling – using the (Jostens) pull-out program (so she is not able to help very much when I bring my students into the lab)." The curriculum alignment issue was mentioned again. Without the expertise to use Fastrack and to align PLATO to the specific course content, Ms. Cooney became frustrated. "I need to go through all the modules and see what is appropriate – to be sure the modules are not at too high a level (than where my students are)."

Ms. Julie Hubbard, Lab Manager. I met with Ms. Hubbard in the PLATO lab. She is Title 1 certified as well as certified to teach elementary education. She explained there are 10 machines dedicated to Jostens in the back of the lab – for the special needs pullout program (GED), and 24 PLATO machines with 10 more on the way. She was the school's computer teacher who migrated to the lab to work with the students in the pullout program and then inherited the management of the PLATO stations during the pass-to-play lab implementation. She explained how the lab strategy has evolved. "The athletes didn't use it (PLATO lab) so we went to a rotating schedule last spring to expose teachers – and all kids (not just athletes) - to PLATO. English and Math used it." She identified Social Studies and Science as a weak area in PLATO. "The science is

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[8] *Editor's Note:* Since this evaluation, most PLATO science curricula have been upgraded to new products from its CyberEd division.

very similar to WICAT and is a bit old and dated.[9]" In terms of PLATO training, "We got 2 days of training from PLATO. When we had initial problems, we were on the hotline for support every day but lately, it has been pretty good. We need a (dedicated) server here – it can be very slow."

There is presently no opportunity for teachers to co-plan curriculum with Ms. Hubbard to develop curriculum alignments but "they (school administrators) maybe expect me to be the leader there – to forge collaboration. Maybe I should do more of that." But importantly, that was not an explicit expectation. Teachers are a bit resistant under the present system. We can't split classes (half come to the lab, half stay with teacher in classroom) because I have to be with the Jostens kids. I have primary responsibility for those GED kids and cannot watch the PLATO students very carefully."

Ms. Hubbard also reported that they do not use Fastrack. The HSCT remediation classes use it and the lower level reading classes use it for remediation. Unfortunately, no teachers from either course were available to be interviewed during my visit. When asked about the school's goals for PLATO, she replied, "PLATO goals are weakly defined but are evolving."

Students. I then met with four students: two sophomores, Joyce and Jimmy, and two seniors Jill and Jen. Joyce used PLATO twice in her Geometry class, to complete missing homework, once for extra credit in Algebra, and once to make up a test in math class. She was very positive about it, reporting simply "I like it." Jimmy reported "I

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[9] *Editor's Note:* PLATO science curricula have since been replaced.

used it in Geometry, Chemistry, and English. In Chemistry, during class and to finish work after school; in Geometry I used it to get extra credit. I like it a lot. But I don't get to spend enough time in it." When asked if there was anything about the program he did not like, he replied, "some tests you can't take again. And the double click is too fast if you enter too fast[10]. The machine remembers. I also used it in Austin's class two days a week for the FCAT program. I think the whole class should go more. I'd be failing math without it."

Jill used PLATO in the Graduation Assurance Program (GAP) and in English 3. "I used it every day for 50 minutes in GAP. It's good. I took tests. I can work at my own pace without the teacher bothering you. I control it – there is no time limit. Many seniors used it for their senior projects. It is a good program. A lot of students wouldn't be graduating without it. Then she emphasized, " I wouldn't be graduating." Jen, also a senior, transferred in from another high school and used PLATO to catch up in her new classes. "I used it for Algebra II after school. I couldn't figure out some things so needed to catch up. I got extra credit for going." She also had trouble with the superscript and subscripts and found them very frustrating.

Another group of four sophomores came in for a group interview: Ben, Bill, Bob, and Barb. Ben said, "I used it a little in the spring. This year I use it in math for extra credit." Perhaps reflecting a common sentiment among adolescents in this video-game age, Ben complained, "I hate that we have to turn off the audio (to not distract other students). It'd be better with audio.[11]" Bill used it in Spanish. "Now I use it for extra

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[10] *Editor's Note:* Click sensitivity is adjustable under Windows.

[11] Headphones were not provided in this lab.

credit in Chemistry. If every class used it, it'd be great. Head phones would be great," apparently echoing Ben's desire for audio. "It keeps you focused more. You have to work on it"

Bob reported using PLATO in the spring too. "This year I use it in Reading and English for extra credit and after school. I like that you can go to mastery test to see if I know it." In terms of problems, he reported, "it freezes up a bit." But overall he was very positive about his PLATO experience. "I like that you can work at your own level and pace. It gives you one-on-one; teachers cannot do that." Barbara uses it in Biology, Chemistry, and Geometry. "It has really cool diagrams that I can finally understand. And I go at my own pace. I like that."

Atlantic High School Implementation

Atlantic High School (AHS) was included in this evaluation because: 1) PLATO usage by its teachers in the normal curriculum was characterized as "high," 2) its comparability to the other two schools included in the evaluation, and 3) its proximity to the other two schools.

Program Description

PLATO Program Goals. As with the other schools, AHS used PLATO for the required pass-to-play after school program. It also used it to support a great number of teachers in their regular classes. After usage increased dramatically in Spring1999, the school had to begin scheduling the lab in 35-minute sessions to allow three teachers to bring their classes to the lab per block. But even with this accommodation, the lab is overbooked with teachers unable to get into the lab. Some teachers used it for HSCT remediation. The PLATO program goals go far beyond supporting athletes to conform to the pass-to-play policy to that of widespread integration across the curriculum.

Instructor Characteristics and Role in Program. AHS decided in 1998-99 to support the PLATO lab with a dedicated lab manager who was responsible for curriculum integration as well as technical support. This decision necessitated the reassignment of an existing staff position resulting in an administrative shortfall elsewhere. But using the lab as an instructional resource for all teachers was given high priority, so the shortfall was a price that the principal, Mr. Pagano, was willing to pay. The lab manager was assigned to the PLATO lab Monday through Friday during the school year to support all teachers who wanted to use PLATO in their classes. The lab was also available after school for athletes to adhere to the pass-too-play policy

PLATO Implementation Description

AHS used PLATO primarily for three purposes:

After-school lab – this is an optional PLATO lab for athletes who need remediation or extra help in a course. The lab is staffed thus increasing their chances to succeed in the normal courses.

Summer school – is designed for students who have failed a math course and cannot advance to the next course in the math sequence. This course used PLATO to customize a curriculum that enables students to practice the skills necessary to successfully pass the failed course.

Widespread integration across many disciplines.

Evaluation Implementation

Procedures for data collection. I met and interviewed the following AHS faculty and staff:

12:30 Mr. Ron Pagano, Principal

1:00 Mr. Don Boulware, English Teacher

1:15 Jennifer Taylor, Science Teacher

1:30 Student

2:00 Terri McCittrick, Lab Manager

2:45 Jim Clements, Chemistry and Kent Booker, Geometry

Results

The results are organized into two sections, Attitudes/Beliefs and Interviews.

Instructor Attitudinal/Beliefs

Table 1 displays the frequency distribution by item of the responses to the instructor survey administered. It includes: Part 1 - instructors' agreement or disagreement with different PLATO features; and Part 2 – instructors' descriptions of how often they perform certain priming and instructional activities in support of PLATO. Respondents included Mr. Clements, Chemistry, Mr. Boulware, English, and Ms. Jennifer Taylor, Honors Biology. Respondents' experience at using computers (including non-PLATO) in their teaching varied among respondents. Instructor open-ended responses are summarized in Table 2 (both tables are at the end of this report).

Interviews

[NOTE. Ms. Dupont accompanied me to Atlantic but news of a tragic student suicide caused her schedule to be changed to counsel and comfort grieving students.]

Mr. Ron Pagano, Principal. We met in a room adjoining the PLATO lab. He described how usage has evolved. "Last year (1998-99) we used it primarily for FCAT remediation for our 11th and 10th graders. This year **all** teachers incorporate the lab into their regular classes. [This is an exaggeration. In fact, most do). The lab is fully booked. We still have 70 seniors who need to pass the FCAT though." He described how the schedule was revised to accommodate the increased demand in the lab. "To accommodate all the teachers who want to take their classes to the PLATO lab, we had to shorten the sessions to 35 minutes with three classes using the lab per block." I asked how he got his teachers to use it so much, so quickly. "We asked our teachers to use it

and it does correlate to their merit evaluation. Teachers also get one staff development point from the district (to attend training)...We haven't had many management problems from my point of view. Our faculty has embraced it."

Mr. Pagano stressed the importance of communication about the lab. "We have made a concerted effort to communicate that the lab is open after hours for all our students. We talk it up every day and have business cards printed. I give them out to everyone I see – parents, business leaders. Terri (the lab manager) has been wonderful at promoting the lab."

Asked if the system has helped AHS reach its goals, Mr. Pagano answered "Has it helped?" he repeated, "Definitely. Students can convert an 'I' (a grade of 'Incomplete' in a course) into a 'C.' We use it for Honor Roll students (SAT, college prep), for students who need to finish and "I" and for all ability levels in HSCT and FCAT remediation and prep. Regarding the athletes, our academic advisors advise the coaches about student-athletes' progress, and the coaches then pressure their players to come to the PLATO lab if they are at risk. This part of the program is still not that successful as athletes are not using it that much."

Mr. Pagano described other uses. "We also use it in our Teen/Parent program. We have another five stations at that school. This is a 'school within the school' where high school girls who get pregnant and have a child can get child care onsite and complete school."

Following up on Dr. Colwell's comments about increased technical problems accompanying greater PLATO usage, I asked Mr. Pagano if AHS had experienced any technical problems. "Randy, our assistant principal, is a computer person, and has helped out Terri – and between the two of them, they can fix many of the problems that

come up. The lab is closed for ½days Fridays for lab administration. Technical problems and support are very important. Having a dedicated lab person there – full time – is the key. Terri is absolutely key. She was a support administrative staff person but we brought her in here and shorted ourselves in another area (as the district provides staff for after-school only) because we saw it as a priority."

Mr. Pagano became animated in relating some of the success stories he witnessed. "We had a student who did not graduate, but came back on his own time and worked on PLATO with Terri and finished in October of year 5. Another girl failed her HSCT and was in the Sylvan program. She came to Terri and she made it too. We have a custodian, who is a non reader, using it."

His favorite success story, however, involves a special needs student. "Superintendent Hall came into the lab one day when a class of special needs students were in there – unannounced to the kids –to see how we were using it (PLATO). One severely handicapped student, a senior who was reading on the 2nd grade level, told his teacher to 'get up because he (Hall) needs to sit here (next to the student) to see what I can do.' Then in the very next class, a general education class, each student was working at their own level with the teacher walking around the room helping individual students. This is powerful stuff and it was great for him (Hall) to see." Still he sees more potential, "we are trying to figure out how to get students to use it more – as well as parents who need their GEDs.

Mr. Don Boulware, English. Mr. Boulware teaches 10th grade English and has used PLATO for two years. "I am very pleased with PLATO," he begins, "I use it for FCAT skill remediation, and to reinforce class work - like comma rules. It is better than teaching in some ways; kids are very engaged. I am a writing teacher and this enables

me to facilitate. I mean, each kid is at a different place and this allows me to walk around and help each kid. At-risk students, for example, have lots of trouble with sentence fragments and one-on-one help is key. PLATO helps free me to do more of that." But it is not just low-ability students who benefit, he insists. "All ability levels take to it. Average kids like it. High-ability kids go to the SAT review and low-ability kids like it because they get instant gratification. They see a cause and effect." He observes students transferring skill acquired in PLATO to other contexts, "students have said 'I remember seeing that in PLATO.'"

Mr. Boulware was quick to add the importance of having a resource like the lab manager and curriculum resource person, Terri McCitrick. "Terri has been great. She has co-planned the curriculum with me." In terms of training, Mr. Boulware indicated he was aware of courses offered in the summer though he did not take advantage of them. I asked him if he encountered any problems using PLATO and he reported that systems freezing or crashing occurred too frequently[12].

Ms. Jennifer Taylor, Science. Ms. Taylor is very favorable about PLATO in general (see her survey responses in Table 2,) and uses it often but had a bad experience this past summer because of recurring system crashes and computers 'locking up' too frequently. "The county decided to use PLATO for summer remediation. The summer session was attended by many students who failed a course during the year as well as some ESL kids." Despite the technical glitches, she was still positive about the summer. "Overall the summer went really well." She observed and interesting phenomenon. "A Korean girl who did not know English at all was having difficulty in the English

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[12] Appendix A addresses technical and support issues.

modules but learned English from the Math modules because she knew the math and could figure out the words in the context of a math problem."

Ms. Taylor explained that she used PLATO in other ways as well. "Last fall (1998) I gave students extra credit for coming after school to prepare for the county's very difficult cumulative science test. And amazingly, these students got 90s on this test - and these kids do not normally get A's. But I had more mixed results after that. Ms. Taylor also had several recommendations for improving the interface and supporting materials.[13]

She explained that her comments about the technical problems and interface recommendations were intended to improve the product, and must be taken in the context of an overall positive experience using PLATO. "I am really not whining. I want to make it work. I really think the program has worked. I just want to be able to use it the way other disciplines use it. Last year I used it for one hour per week to introduce or review a lesson. And kids came before and after school. This year we are down to 35 minutes per week. I'd love to use it in my classroom – like having 8 PCs in my class. Then I'd use it three times per week. Kids have to double up in here (36-40 students in some classes) which is not ideal. I'd help PLATO if they want input on how to make it better. I want to use it and make it work."

Terri McCittrick, Lab Manager. Ms. McCittrick recounted the history of the PLATO lab and her involvement in it. "Last year," she began, "I became (full-time) lab manager in September. Most schools have no support so they split up the PCs – like

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[13] *Editor's Note:* Since the evaluation, the PLATO science curriculum offering has been replaced and considerably expanded by acquistion of the CyberEd curricula.

four in math, four in English – and they (the computers) just sit. In the first trimester, we used it for HSCT remediation only – either for entire classes, or half classes. Half a class would come down here and then switch with the other half. But on the block, we could only get three classes per day in here. Then Mr. Pagano gave me the opportunity to try something new. After the first trimester, I saw something special and I ran with it. This year we opened it up for all teachers; and we now have a waiting list and had to limit lab time to 35 minutes. Pretty much word of mouth has spread its popularity and usage." She recalls last summer before school began. "I got phone calls a week before school started at home from teachers wanting to schedule in the lab."

When I asked if she thought PLATO use impacted student achievement, Ms. McCittrick answered, "I know test scores will improve. I think all high schools should use it." She uses Fastrack to customize the curriculum. "Fastrack is great– especially for lower level kids."

Training the teachers about PLATO so that they could use it effectively in their courses was a major commitment AHS made. Ms. McCittrick adds, "We provided five PLATO laptops for teachers to take home and work on curriculum alignment." She describes how teachers use the lab. "All the teachers stay in here and teach individual students while the rest of the class works on their curriculum. I do a 15-minute orientation before every course in here. From then on, they come in and know what to do." Regarding discipline in the lab, she explained, "We do not allow any talking in the labs – except if kids are on task and helping one another. But I have had only two referrals (for disciplinary problems) in here in 1 ½years. Honestly I think the kids like it. I have kids waiting for me at 7AM or after school to work on PLATO. They always stop me in

the halls and say 'Hello Mrs. PLATO lady." I see kids work in it and succeed. I have seen severely handicapped kids make small discoveries using PLATO and it gives me goose bumps."

She reports that athletes have not used it except in their normal classes. "But the county needs to see that it has touched the lives of many students – not just athletes. There are 1640 students here and 930 of them use PLATO on a regular basis." She estimates off-hours usage (mostly for extra credit) as follows:

15-20 students before school

5-10 students at lunch

0-20 students after school.

The school has been innovative in using the lab. "We have used it with a program where we pull bright kids out of PE, e.g., to be tutors in the lab with lower ability students. In the Storefront program (a last chance for juniors and seniors to get a degree), they use PLATO to help them pass the TABE test (entrance exam to community colleges)." Finally, Ms. McCittrick reports that technical problems have decreased and now occur "about once per week now. This program is fantastic," she concludes. "Even with the technical problems we experienced, it is still worth it."

Jim Clements, Chemistry. Mr. Clements is retired from the military and has used PLATO fairly regularly. He is a fairly heavy user and was very positive about PLATO (see his survey responses in Table 2). But he also voiced some concerns and offered some recommendations to improve PLATO. "After-school usage is big. There are always kids in there. Kids really work at it and they like it. They really eat this stuff

up. A big thing holding me back is that there are too few machines or (PLATO) licenses."

Kent Booker, Geometry. Mr. Booker uses it outside of class time. "I send my kids there after school for remediation or to make up a test. They can also go and work for extra credit." But he voiced concerns about the size of the lab and number of computers. "There is not enough room in there. Some teachers started using the lab as a break (for both the teacher and their students) but now we are finding students asking questions they couldn't ask before. Some kids use the Algebra modules in my Geometry class. It has also helped prepare students to pass the state exam." According to Mr. Booker, "The HSCT pull out remediation program is very helpful. Teachers voluntarily released students from class to work in PLATO."

Fred, Student. Fred is in his secor d year working with PLATO. He used it for science last year and history this year. "It is a great program. I really like it. It is another way of learning besides the classroom." He recommends that it would be nice to return to the previous day's exit point in PLATO.[14] He comes before and after school as well as his once per week with his class.

Discussion

This report describes PLATO implementations at three high schools in Volusia County, FL. It was not possible to analyze student performance because PLATO data and test

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[14] *Editor's Note:* This feature, called bookmark & restart, is standard in PLATO.

scores could not be associated for individual students. So without achievement data, the question might be asked why should anyone care?

This report may be useful to administrators contemplating using PLATO in three ways:

First, it is interesting to examine the role of the central office in the implementations. Most other PLATO evaluation studies have been exclusively school-based and do not address the central office's role.

Second, it may be enlightening to examine how differently the three schools, despite receiving the identical County mandate and support to carry it out, approached the implementations.

Third, since it is possible to compare these schools' strategies and implementation plans given the same resources and starting point, it will be instructive to relate these implementations to the success factors identified by Rob Foshay in Technology Paper #5 to both confirm and inform those recommendations.

Again, this discussion should prove useful to administrators trying to divine a strategy that reflects best practices in PLATO implementation.

Central Office. The School Board' unilateral decision to adopt a large-scale implementation of this magnitude, while well intentioned and a departure from their normal practice, was probably a poor one. The only goal initially for the PLATO investment was to respond to critics of their newly adopted pass-to-play policy for athletes. I do not fault the motives of the Board to pursue rigorous standards for all students. But the knee jerk reaction to mandate that all schools provide after school support for athletes was hasty and resulted in implementation problems. There were no instructional goal or instructional strategies. It was left to the individual schools to

figure it out. Some administrators saw it as an opportunity and made the most of it; others viewed it with some curiosity and resentment. But the tricky part was determining what the central office's role should be in assisting schools to use PLATO effectively. The staff were in the unenviable position to have to sell the virtues of a product that just 'showed up' on administrators' doorsteps. In fact, it is probably fair to say that central office felt a bit of pressure to encourage administrators to use these resources more productively. That kind of tension can and should be avoided in any implementation.

For their part, Ms. Dupont and her staff did work hard to identify training and instructional help for the schools. All three schools are learning what PLATO can do and how best to align it with their individual goals. There are clearly good and talented people working hard to make it work. And considering the very short start up time, they seem to have made considerable progress.

A Tale of Three Cities. The same can be said of each of the schools I visited. They are all good people, and effective teachers and administrators. And it is not surprising that DeLand (DHS) and New Smyrna Beach (NSBHS) teachers were leery. They had insufficient training and instructional help using PLATO's diagnostic tools to align to individual students' needs. To them, using PLATO was a bother and created more work for no foreseeable gain. Their reticence is understandable, even predictable, given the lack of clear goals and strong support. Mr. Moye, the principal of DHS also seemed concerned with the 'opportunity cost' question; what do students miss when they are pulled out of their normal class?

The surprise, moreover, is not that DHS and NSBHS were slow in adopting, but that Atlantic was not. Mr. Pagano saw the PLATO and computer purchase as an

opportunity. Early on, he realized that a dedicated staff person was required if PLATO's potential was to be realized. He also saw the need to provide training and, importantly, incentives for his teachers to become proficient users. He allowed teachers to bring laptops home for a period to go through and learn the curriculum. And finally, he promoted the lab. He advocated for lab use, and actively promoted widespread use across the curriculum and after school hours. AHS seemed to have a unique culture, where risk taking and innovation were encouraged. According to Ms. Dupont, technology use has been historically - for the last six or seven years - more widespread at Atlantic than at other schools. ; The lack of a dedicated lab person in DHS and NSBHS led to many of the frustrations and likely to many of the technical problems experienced by teachers there. That the existence of Fastrack was not known is a good indication that the level of understanding was not adequate to generate much momentum integrating PLATO instructionally into the curriculum. But again, given limited resources and the lack of compelling evidence, DHS and NSBHS administrators have limited resources, and in the absence of evidence, committing staff to an unproven commodity seems like a prudent, conservative decision.

The responses of the three instructors from Atlantic High School, summarized in Table 1 (below), were quite favorable. Noteworthy is that these three were quite frank in the interview about their needs and recommendations for improving PLATO. But their responses to the survey items, particularly the open-ended responses, indicate a very positive attitude notwithstanding any technical problems. Their comments during the interview were intended to help improve the program or solve a local lab problem, and seemed to come more from a genuine desire to make what they see as a great program, even better.

Even where there was no lab manager to smooth the way, the technical problems were less of a distraction for the students than they were for the faculty. The students in all three schools were very positive about their PLATO experience and only wished they could spend more time in the lab. Most faculty believed that PLATO particularly helped their low-ability students. They acknowledged that these students often benefit from the infinite patience and diagnostic features of PLATO.

The superscripts/subscripts seem to definitely be a problem. Virtually every science teacher voiced frustration about the inability of the program to interpret reasonable syntax input, its failure to provide meaningful feedback.[15] The other major concern related to frequent system crashes. Not enough is known to venture an explanation. It could be a local network problem or a more serious conflict.[16] But the greatest problems seemed to occur in the summer when there was limited technical support. Certainly, if the school intends to use PLATO for summer remediation courses, better technical support needs to be provided.

Success Factors. Although improved student achievement cannot be measured, the AHS model seems to work extremely well. What factors made their implementation work? Following is chart that relates all three implementations to the success factors identified by Rob Foshay in Technical Paper #5 to both confirm and inform those recommendations. The factors are then discussed described above that were present at AHS and lacking at DHS and NSBHS are for the most part, consistent with Foshay's list.

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[15] *Editor's Note:* PLATO science curricula have since been replaced.

[16] *Editor's Note:* An analysis and recommendations are presented in Appendix A.

Presence or Absence of PLATO Implementation Success Factors by High School

Steps	DeLand H S	New Smyrna Beach HS	Atlantic HS
Step 1: Get Buy-In from Key Personnel	Absent	Present	Present
Step 2: Decide on Program Goals	Absent	Absent	Present
Step 3: Decide on the Instructional Applications of Technology	Absent	Present	Present
Step 4: Develop Instructional Models for Applications	Absent	Absent	Present
Step 5: Develop an Instructional Management Plan	Absent	Absent	Present
Step 6: Plan Hardware/Software/Support Deployment	Absent	Present	Present
Step 7: Plan Professional Development	Absent	Absent	Present
Step 8: Plan Evaluation	Absent	Absent	Absent

Aligning the curriculum to the course (and state standards) is something Foshay sees as critical. That many AHS students were allowed and encouraged to self-pace and work toward mastery in their own individualized program are also advocated by Foshay.

Atlantic's commitment to regular scheduling (35 minutes per week) over an extended period is shared by Foshay, who advocates 'sufficient and frequent time on task.' And finally, strong leadership with clear objectives is a factor seen as critical by both.

Foshay also identifies in Technology Paper #5 nine steps that are necessary for a successful PLATO implementation. Following is a list of those steps and a brief discussion of what AHS unknowingly did to accomplish them:

Step 1: Get Buy-In from Key Personnel. At AHS, the instructional decision to adopt PLATO was made by the School Board, but was embraced and championed by the principal, who is probably the most important player. In the case of DHS, a fair characterization of the principal's commitment might be that of 'luke warm' or 'wait and see.' The support at NSBHS was stronger and seemed to be growing in itensity, but they were still not in with both feet.

Step 2: Decide on Program Goals. The instructional goal for using PLATO at AHS might be characterized as full and complete integration into the curriculum.

Step 3: Decide on the Instructional Applications of Technology. From among the three uses of software - supplementary, complementary, and primary – AHS is all three ways. PLATO was used to be the primary teaching vehicle (tutorial). But it was also used to support other approaches.

Step 4: Develop Instructional Models for Applications. Foshay describes four instructional models (review/reinforcement, enrichment, problem-centered, and skill development) any one of which are valid approaches. AHS used PLATO to develop skills and for review.

Step 5: Develop an Instructional Management Plan. That role fell to the lab manager. She maintained usage data.

Step 6: Plan Hardware/Software/Support Deployment. This seemed to be done on the fly at all three schools. AHS was fortunate to have a tech-savvy assistant principal in addition to Ms. McCittrick.

Step 7: Plan Professional Development. AHS addressed early on the need for professional development for it faculty. Ongoing training will be a challenge.

Step 8: Plan Evaluation. It is unclear that any of the schools collect data to measure the efectiveness of PLATO. Certainly, a more diagnostic approach would be a benefit.

In sum, AHS's implementation plan, with no previous knowledge of Foshay's eight steps, was very similar to those recommended, thus validating the usefulness of the model. The role of the central office and School Board in the present study, while not likely to be relevant in most implementations, was a major factor. Perhaps *Step 1, Buy-in by key personnel,* should include a discussion of the role that central office may play.

Table 1: Atlantic High School Instructor Survey Response Frequencies by Item

Part 1 Directions: We would like to know how you felt about your experience teaching with PLATO systems. For each of the statements below, please check the box under:

SA if you strongly agree

A if you agree

N if you neither agree nor disagree

D if you disagree

SD if you strongly disagree

Item		SA	A	N	D	SD
1	The PLATO course content includes what my students need to learn about the topics taught.	2	1			
2	The PLATO course objectives correspond to those for my course.	1	2			

3	The PLATO course content corresponds to the content of the standard end-of-course test we use.		2	1
4	Content seemed generally free of errors and inaccuracies.		3	
5	Content was generally up-to-date.		2	1
6	Quality and style of instruction was consistent throughout the curriculum.		2	1
7	Students generally understood the explanations.		2	1
8	There was adequate depth in exercises and tests.		2	1
9	Tests, application/drill lessons, and tutorials corresponded to the objectives in the Instructor Guides.	1	1	1

10	Tutorials involved the students through frequent questions, answers and feedback, rather than just reading.		2		1	
11	Software was generally free of bugs and errors.			1	1	1
12	All courseware used consistent keystrokes and display style.			1		2
		SA	A	N	D	SD
13	Color was used appropriately.	1	1	1		
14	Graphics were used appropriately.	1	1			1
15	Screens were consistently readable.	1	2			

16	I was able to use student progress reports to identify students needing my attention.	2	1		
17	I was able to spend time in one-on-one tutoring and counseling while students used PLATO.	2	1		
18	I was able to make appropriate individual student assignments on the system.	2	1		
19	My students were scheduled to use PLATO for as much as they needed.		2		1
20	I was able to relate what the students studied on PLATO to what they studied in other activities.	1	1	1	
21	In general, my students respond well to the PLATO system.	1	2		

22	My students rarely seemed confused or "trapped" by the system.			1	1	1
23	My students respond well to the PLATO system.	1	2			
24	I find working with the computer is generally a productive, rather than frustrating, experience.	1	1		1	
25	I enjoy working with the PLATO computer system.	1	2			
26	The PLATO system plays a useful role in my teaching.	1	2			
27	I was adequately trained to operate the PLATO system.	1	1	1		
28	I would like more training on how to use PLATO to best advantage in my teaching.	1	2			

Part II Directions: Please rate how often you performed the following activities in class before your students used PLATO. Circle your responses using the following scale:

5 Before or after each computer session

4 Before or after most computer sessions

3 Occasionally, before or after a new unit or lesson

2 At the beginning of each semester or marking periods

Maybe one time during the year

0 Never

Item	Rating					
	5	4	3	2	1	0
29 Articulated to the student(s) in some way those prerequisite skills, knowledge, or attitudes needed to fully succeed with their newly assigned PLATO modules.					1	2

30 Helped the students relate what they were about to learn in their PLATO assignments to their own personal previous experiences.

1 2

31 Described to the students the specific objectives they were going to learn within their assigned PLATO courses or modules.

1 1 1

32 Explained to the students how the skills and knowledge learned within their assigned PLATO modules fit into the overall course lesson goals.

3

33 Clearly identified to the students the rewards and incentives for trying hard and doing well within the PLATO system.

1 1 1

34 Explained to the students specific procedures for getting support if they didn't understand something they were trying to learn within the PLATO system

1 2

Table 2: Summary of Atlantic High School Instructor Open-Ended Survey Responses

Part III Directions: Please write your responses to each question in the space provided.

1. What do you like **best** about teaching with the PLATO computer?

Mr. Boulware, English: "Excellent supplement to my reading and grammar content."

Mr. Clements, Chemistry. Mr. Clements enumerated six features:

Pace and feedback are individualized for each student.

(Assigning students to their own computer) holds their attention

No shortcuts (forces students to work through it)

Higher-level material available for gifted students/interested students

Low-level material available for students struggling with basic concepts

Great graphics, screens are crisp and 'high-tech' looking (although he also described some screens as 'pretty sad').

Ms. Jennifer Taylor, Honors Biology. "I like how students can learn at their own pace. I like using PLATO as a review tool. For ESOL students, I've used PLATO math tutorials to help students learn English."

2. What do you like **least** about teaching with the PLATO computer?

Mr. Boulware, English: "We need more computers. Not all students can always get on one. The system crashes/lock ups are very frustrating."

Mr. Clements, Chemistry. "The frequent error messages and lock ups. The input of math symbols in the chemistry modules is odd and extremely cumbersome."

Ms. Jennifer Taylor, Honors Biology. "The RDS programs do not have clear instructions. In addition, the RDS tests cannot be re-taken."

Was there a regular time at which your students experienced their PLATO modules?

Mr. Boulware, English: "I used PLATO as a supplement to the curriculum and to reinforce grammar and reading skills. PLATO modules correspond with the weekly class sessions."

Mr. Jim Clements, Chemistry. "I use it for review and remediation. I also give students extra credit if they review work in the lab. And I use it to prep for the HSCTs and SATs."

> Ms. Jennifer Taylor, Honors Biology. "I encourage students to use it after school for review for extra credit. I also use it to introduce some lessons and after others. Unfortunately, the time we have this semester (only 35 minutes every other week) is not enough – it was more effective last year when we had one hour a week."

Describe any strategies you employed to determine whether or not the PLATO modules assigned to each student were the most appropriate for ensuring their success in your class?

> Mr. Boulware, English: "I have individual student conferences that helps me monitor student learning better."

Mr. Clements, Chemistry. "I run through them (the modules) myself and did an alignment chart with my curriculum."

Ms. Jennifer Taylor, Honors Biology. "I gave the students a check sheet of assignments that correlated with county and state standards."

5. How would you change the PLATO lessons?

Mr. Boulware, English: "Right now, I am very happy with them."

Mr. Clements, Chemistry. "The Chemistry topics seem to too high level. There should be a way to graduate the difficulty level like a video game (novice, amateur, expert, etc.)."

Ms. Jennifer Taylor, Honors Biology. "I would change all of the tests so that they go with the lesson. Change the program so that students know what they did wrong and could re-take."

6. What suggestions do you have to improve the way you use the PLATO system?

Mr. Boulware, English: "None."

Mr. Clements, Chemistry. "Get more site licenses so we don't have to go to the PLATO lab. I'd like machines in my room. Scheduling here (in the lab) is maxed out." He added imploringly in capital letters, **"the students eat this stuff alive and see the benefits! They believe!"**

Ms. Jennifer Taylor, Honors Biology. "I would like to have more time on it. There are many glitches when the computer freezes."

7. What other comments or suggestions do you have on the PLATO system or this course?

Mr. Boulware, English: "Excellent program. Students like it. It is just another way for students to learn these skills."

Mr. Clements, Chemistry. "CWRAT crashes are **annoying**! **Get us tech support**! My initial impression, I'm sad to say, was this stuff was 'not ready for prime time.' But it has improved. Diagnostics are written in computer jargon, and do not tell a clerk (non-technician) what to do next (e.g., lock a lock that should have been locked). He wondered if it was their hardware configuration that was causing problems."

Ms. Jennifer Taylor, Honors Biology. "I would like worksheets that went along with the modules. Re-posttests – allow them to re-take. The computers crash too often and students work is lost."

Appendix A: Discussion of Technical Problems and Recommendations

Participant Quotes Describing Technical Problems

DeLand High School

Ms. Mary Lundell, Science

PLATO has problems with subscripts and superscripts. Students would become frustrated when they knew a correct answer but entered incorrect syntax and could not get feedback about the error.

The DNA replication, transcription, and translations are not very reader-friendly, and that much of the science in PLATO is too low a level for the IB (International Baccalaureate, advanced) students.

New Smyrna Beach High School

Ms. Cooney, Chemistry

PLATO does not handle subscripts and superscripts well at all.

Include tests at the end of all lessons. The beginning modules don't have that.

Eliminate the case-sensitive feedback, the keys should reflect the keyboard.

Atlantic High School

Mr. Don Boulware, English

The system crashes too often. Terri sometimes fixes it, sometimes not. But when it happens students lose their work and that frustrates them.

Ms. Jennifer Taylor, Science

This past summer I used PLATO a lot and had a bad experience because of recurring system crashes and computer 'locking up' too frequently. It crashed a lot. I had to reboot - maybe 20 times per day - and it was randomly on different machines throughout the day. This was disappointing to me as I was an early (PLATO) adopter and was telling all of the science faculty how great PLATO is and then when they come in to use it in the summer, it was not working well. The only group that stopped coming in was the science group, which was painful to me personally.

The support instructional materials should better correlate with the modules. The EC told us that these (materials) could be used in lieu of wet labs, that theses materials could be used instead of buying books - but that is not true.

The science RDS program does not tell my students which questions they missed. But I was able to make a worksheet to work around this problem. Also the printouts do not tell you which concepts are being missed and I cannot get printouts of the quizzes.

There is just not enough detail in the reports. There are also not clear onscreen navigation instructions. She felt that RDS was a DOS-based program and was not as user-friendly as some of the other PLATO interfaces.

Mr. Jim Clements, Chemistry

Subscripts and superscripts are a big problem. Too precise an entry is required with no feedback what you are doing wrong. I developed a cheat sheet for entry problems to help students get the syntax exactly correct.

The 800 number was useless. Terri is really great. This program at times seems like a Beta version – there are way too many errors. We should not be receiving messages with .BAT and .HEX messages in it. Errors are in the wrong language – who understands that stuff?

The English and Math visuals are really great – but science is second class visually.

Make the different difficulty level more apparent and simpler to understand.

Analysis of Technical Issues in Volusia County Schools

This appendix first summarizes the technical support history of the three Volusia County schools included in this evaluation. The summary is followed by recommendations.

Summary of technical support history

This study characterized DeLand High School as a low PLATO usage school, New Smyrna Beach High School as medium usage and Atlantic High School as a high PLATO usage school. This usage pattern closely matches the incident log in PLATO Technical Support. Below is a table recording site calls to PLATO Support for technical help. The call pattern closely matches the PLATO usage described by the three sites. This year's calls from Atlantic were on installation and use of World View.

Site	1998	1999	2000	2001
DeLand	6	1	1	0
Atlantic	0	2	3	3
New Smyrna	1	3	0	0

Most of the issues mentioned in the evaluation (from all sites and responders) centered on general implementation issues. Of the 20 incidents over four years, only ?? specifically concerned technical issues of performance or reliability. All of the incidents were closed with a positive outcome.

There was an initial set of implementation discussions, training sessions and on-site technical assistance given during the start period. But it appears that as time passed, each site's implementation "vision" for PLATO matured and changed while at the same time an effective follow-up plan was not formalized. All of this has contributed to the inconsistent usage of PLATO and differing feelings of success at each site.

Volusia purchased 20 service days to implement the PLATO program. Of this amount only 9 days have been used as of this report. Service days are used for professional development, consultation, and technical support.

Recommendations

A good use of the remaining service days would be a "mid-course correction" starting with a full implementation session devoted to these items:

- setting teacher expectations,
- curriculum alignments,
- instructional models,
- avenues for technical support,
- techniques to increase effective student usage,
- product training,

- the setting of a long term action plan and follow-up schedule

The outcome would be a long term action plan and follow-up schedule.

The evaluation includes a large number of student and teacher comments reporting the positive experiences they had using PLATO and the many ways PLATO has improved their learning environment. It is clear that there is a strong base to work from and extend the benefits of using PLATO to all Volusia sites.

Schedule on-site technical time with Volusia technicians to insure that the networks are optimized for PLATO and that any technical issues are identified and resolved.

Identify a PLATO manager for each site to serve as the person responsible for PLATO and as the main contact to PLATO Learning's support team. Several staff from Atlantic Beach High School mentioned Terri McCittrick as being a key player in promoting PLATO and insuring its success at Atlantic. We often find that a dedicated lab manager plays an important role in the effectiveness of PLATO. Identifying such a person at each site is a recommended part of many implementations.

Consider upgrade to the new CyberEd Science Curricula. Several teacher comments in the evaluation related to the difficulty of entering information into and/or the "look and feel" of certain programs. These comments are generally focused on some of the

older science packages. To strengthen the PLATO science offering, PLATO Learning has acquired an award-winning science curriculum company, CyberEd.

About the Evaluator

Robert D. Hannafin is an assistant professor of Instructional Technology at the College of William and Mary, where he teaches preservice teachers at the graduate and undergraduate levels. He earned a Ph. D. in Instructional Technology from Arizona State University in 1994. His research interest is identifying features of computer-supported open-ended learning environments that contribute to learning gains. He has published in numerous educational research journals including the Journal of Educational Psychology, Educational Technology Research and Development, and the Journal of Educational Research. Hannafin serves as a board member of Educational Technology Research and Development and recently served as guest editor for a special issue in that journal. He has served as evaluator or co-evaluator on several grants.

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